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appointed according to Article 29 of Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020

UK Technical Assessment

0843-UKTA-22/0037 of 20/01/2023

Technical Assessment Body Issuing the UKTA:	UL International (UK) Ltd
Trade name of the construction product	Hilti Firestop Mortar CFS-M RG
Product family to which the construction product belongs	Fire Stopping and Fire Sealing Products - Penetration Seals
Manufacturer	Hilti Corporation Feldkircherstrasse 1^{0}0 9494 Schaan LIECHTENSTEIN
Manufacturing plant(s)	HILTI production plant 7a
This UK Technical Assessment contains	35 pages including Annexes A to D which form an integral part of this assessment
This UK Technical Assessment* is issued, on the basis of	EAD 350454-00-1104, September 2017

*** in accordance with Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020**

Content

SPECIFIC PARTS OF THE UK TECHNICAL ASSESSMENT

1 Technical description of the product

"Hilti Firestop Mortar CFS-M RG" is a kit to be used as a mixed penetration seal based on cement and aggregates.

Additional components	Characteristics
Additional Protection (AP)	Mineral wool mat (for details see Annex D of the UKTA) for cable/small conduit penetrations, wrapped around cables /cable support (trays, ladders), Al-faced outside, fastened with wire, width (length along the cables/small conduits) 200 mm, thickness 30 mm.
Hilti Firestop Bandage CFS-B	Graphite based pipe wrap with classification E according to EN 13501-1.
Hilti Firestop Collar CFS-C EL	Pipe closure device for plastic pipes made from an intumescent inlay in a steel housing with fastening hooks with classification F according to EN 13501-1.
Hilti Firestop Collar CFS-C P	Pipe closure device for plastic pipes made from an intumescent inlay in a steel housing with fastening hooks with classification E according to EN 13501-1.
Fixing components	for "Hilti Firestop Collar CFS-C EL" and "Hilti Firestop Collar CFS-C P". For specification see Annex B.2 and B.3 of the UKTA.
Hilti Firestop Wrap CFS-W	Intumescent wrap used as pipe closure device for plastic pipes with classification E according to EN 13501-1.

2 Specification of the intended use(s) in accordance with the applicable UK Assessment Document (Pre-Exit European Assessment Document): EAD 350454-00-1104

2.1 Intended use

"Hilti Firestop Mortar CFS-M RG" is intended to be used as a mixed penetration seal to temporarily or permanently reinstate the fire resistance performance of rigid wall constructions and rigid floor constructions where they have been provided with apertures which are penetrated by various cables, conduits / tubes, metal pipes, plastic pipes and cable support constructions (perforated or non-perforated steel cable trays and steel ladders).

The maximum opening size of the penetration seal in walls is 1200 mm x 2000 mm (width x height). For more details and details regarding the maximum opening size in floor applications, and details regarding blank seals, see Annex C of the UKTA.

The installation of a blank penetration seal with the dimensions as specified in Annex C of the UKTA is allowed.

"Hilti Firestop Mortar CFS-M RG" can be installed only in separating elements as follows:

Rigid walls type A: The wall must have a minimum thickness of 150 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 550 kg/m³.

Rigid walls type B: The wall must have a minimum thickness of 175 mm and comprise concrete or masonry (e.g. hollow brick), with a minimum density of 1100 kg/m³.

Rigid floors type A: The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 550 kg/m³.

Rigid floors type B: The floor must have a minimum thickness of 150 mm and comprise concrete with a minimum density of 2400 kg/m³.

Rigid floors type C: The floor must have a minimum thickness of 175 mm and comprise concrete with a minimum density of 2400 kg/m³.

This UK Technical Assessment does not cover sandwich panel constructions.

"Hilti Firestop Mortar CFS-M RG" can only be used as penetration seal for cables, metal pipes, plastic pipes or for mixed penetration (combination). Further details are given in Annex C of the UKTA. Other parts or support constructions shall not penetrate the penetration seal.

The first support of the cables, conduits and pipes shall be located at maximum 260 mm away from both faces of wall constructions and maximum 300 mm from the upper face of floor constructions, for details see Annex C of the UKTA.

2.2 Use category

"Hilti Firestop Mortar CFS-M RG" is intended for use at temperatures between - 5°C and + 70°C, but with no exposure to rain and can therefore – according to EAD 350454-00-1104 clause 2.2.9.3.1 – be categorized as Type Y_1. Since the requirements for Type Y_1 are met, also the requirements for Type Y_2, Z_1 and Z_2 are fulfilled.

2.3 Working life

The provisions made in this UK Technical Assessment are based on an assumed working life of "Hilti Firestop Mortar CFS-M RG" of 10 years, provided the conditions laid down in the technical literature of the manufacturer relating to packaging, transport, storage, installation, use and repair are met.

The indications given on the intended working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body, but are to be regarded only as a means for selecting the appropriate product in relation to the expected economically reasonable working life of the works.

The real working life might be, in normal use conditions, considerably longer without major degradation affecting the Basic requirements for construction works.

2.4 General assumptions

2.4.1 It is assumed that

- damages to the penetration seal are repaired accordingly,
- the installation of the penetration seal does not effect the stability of the adjacent building element – even in case of fire,
- the lintel or floor above the penetration seal is designed structurally and in terms of fire protection such that no additional mechanical load (other than its own weight) is imposed on the penetration seal,
- the installations are fixed to the adjacent building element in accordance with the relevant regulations in such a way that, in case of fire, no additional mechanical load is imposed to the penetration seal,
- the support of the installations is maintained for the required period of fire resistance and
- pneumatic dispatch systems, compressed air systems, etc. are switched off by additional means in case of fire.

2.5 Manufacturing

The UK Technical Assessment is issued for the product on the basis of agreed data / information, deposited with UL International (UK) Ltd, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data / information being incorrect, should be notified to UL International (UK) Ltd before the changes are introduced.

UL International (UK) Ltd will decide whether or not such changes affect the UK Technical Assessment and consequently the validity of the UKCA marking on the basis of the UK Technical Assessment and if so whether further assessment or alterations to the UK Technical Assessment, shall be necessary.

3 Performance of the product and references to the methods used for its assessment

Basic requirements for construction works	Essential characteristic	Method of verification	Performance
BWR 2	Reaction to fire	EN 13501-1: 2007+A1:2009	Clause 3.1.1 of the UKTA
	Resistance to fire	EN 13501-2: 2007+A1:2009	Clause 3.1.2 and Annex C.1 to C.5 of the UKTA
BWR 3	Air permeability (material property)	EN 1026:2000	Clause 3.2.1 of the UKTA
	Water permeability (material property)	No performance assessed	
	Content and/or release of dangerous substances	Declaration of conformity by the manufacturer	
BWR 4	Mechanical resistance and stability	EOTA TR001	Clause 3.3.1 of the UKTA
	Resistance to impact / movement	EOTA TR001	Clause 3.3.2 of the UKTA
	Adhesion	EOTA TR001	Clause 3.3.3 of the UKTA
BWR 5	Airborne sound insulation	EN ISO 20140-1:2010 EN ISO 717-1	Clause 3.4.1 of the UKTA
BWR 6	Thermal properties	EN 12667:2001	Clause 3.5.1 of the UKTA
	Water vapour permeability	No performance assessed	

3.1 Safety in case of fire (BWR 2)

3.1.1 Reaction to fire

"Hilti Firestop Mortar CFS-M RG" was assessed according to EAD 350454-00-1104 clause 2.2.1 and classified according to EN 13501-1.

Component	Class according to EN 13501-1:2007+A1:2009
Hilti Firestop Mortar CFS-M RG	**A1**

3.1.2 Resistance to fire

"Hilti Firestop Mortar CFS-M RG" was tested according to EAD 350454-00-1104 clause 2.2.2, EN 1363-1 and EN 1366-3:2009.

Based upon the gained test results and the field of application specified within EN 1363-1 and EN 1366-3:2009 the penetration seal "Hilti Firestop Mortar CFS-M RG" has been classified according to EN 13501-2. The individual fire resistance classes are listed in Annex C.1 to C.5 of the UKTA.

The maximum fire resistance class of the penetration seal in vertical or horizontal separating element depends on the fire resistance class of the penetrating elements. The fire resistance class of the penetration seal is reduced to the fire resistance class of the penetrating element with the lowest fire resistance classification.

The classifications are not valid for sandwich panel constructions.

3.2 Hygiene, health and environment (BWR 3)

3.2.1 Air permeability

The air permeability of "Hilti Firestop Mortar CFS-M RG" with a thickness of 150 mm was tested according to EN 1026:2000 in a reinforced concrete wall with a thickness of 150 mm. The size of the opening was 1000 mm x 500 mm.

"Hilti Firestop Mortar CFS-M RG" was tested as blank penetration seal according to EAD 350454-00-1104 clause 2.2.3. Any other components were not included in these tests.

Pressure [Pa]	**150 to 900**	**1050**	**2100**
q/A air [$m^3/(h \cdot m^2)$]	<0,0009	0,0012	0,0014

Pressure [Pa]	**3750 to 4350**	**4500**	**4650**	**4800**	**4950**
q/A air [$m^3/(h \cdot m^2)$]	<0,0009	0,0012	0,0011	0,0018	0,0022

3.2.2 Water permeability

No performance assessed.

3.2.3 Release of dangerous substances

The manufacturer has provided a declaration on the content, emission and/or release of dangerous substances in relation to their products with the title "Statement on Product Regulatory Compliance: Version 1.1 October 2022).

In addition to the specific clauses relating to dangerous substances contained in this UK Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed UK legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.3 Safety in use (BWR 4)

3.3.1 Mechanical resistance and stability

In impact tests according to EOTA TR001 the requirements for the highest risk zone type (Type IV) have been fulfilled as defined for internal walls in EOTA TR 001 A.1 and for floors in EOTA TR 001 A.4 for safety in use (600 Nm soft body impact, 10 Nm hard body impact) as well as serviceability (120 Nm soft body impact, 6 Nm hard body impact).

3.3.2 Resistance to impact / movement

See clause 3.3.1 of the UKTA

Provisions shall be taken to prevent a person from stepping onto a horizontal penetration seal or falling against a vertical penetration seal (e.g. by covering with a wire mesh).

3.3.3 Adhesion

See clause 3.3.1 of the UKTA

3.4 Protection against noise (BWR 5)

3.4.1 Airborne sound insulation

The airborne sound insulation of "Hilti Firestop Mortar CFS-M RG" was tested according to EN ISO 10140-1:2010 +A1:2012 +A2:2014, EN ISO 10140-2:2010 and EN ISO 717-1:2013.

The acoustic tests were performed in a rigid wall. Hilti Firestop Mortar CFS-M RG was tested as a blank mortar seal without penetrating elements. The seal was 950 mm wide and 830 mm high with a thickness of 155 mm. The area of Hilti Firestop Mortar CFS-M RG was 0,789 m².

"Hilti Firestop Mortar CFS-M RG" was tested as blank penetration seal according to EAD 350454-00-11-4 clause 2.2.10. Any other components were not included in these tests.

The reached values for the airborne sound insulation in accordance with EN ISO 717-1:2013 are:

Weighted sound reduction index R_w
Weighted normalized sound level difference of small building elements $D_{n,e,w}$
Spectrum adaptation terms C and C_{tr}
R_w (C; C_{tr}) = 46 (-1; -3) dB
$D_{n,e,w}$ (C; C_{tr}) = 57 (-1; -3) dB

3.5 Energy economy and heat retention (BWR 6)

3.5.1 Thermal properties

The thermal properties of "Hilti Firestop Mortar CFS-M RG" were tested according to EN 12667:2001.

Component	λ_{10} in W/(m*K)
Hilti Firestop Mortar CFS-M RG	0,232

3.5.2 Water vapour permeability

No performance assessed.

3.6 General aspects relating to fitness for use

All components of "Hilti Firestop Mortar CFS-M RG" fulfil the requirements for the intended use category.

"Hilti Firestop Mortar CFS-M RG" is therefore appropriate for use at temperatures between
- 5°C and + 70°C, but with no exposure to rain and can therefore – according to EAD 350454-00-1104, clause 2.2.9.3.1 – be categorized as Type Y_1. Since the requirements for Type Y_1 are met, also the requirements for Type Y_2, Z_1 and Z_2 are fulfilled.

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

According to the Statutory Instrument 2019 No. 465 – made 5th March 2019 and cited as the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and coming into force on exit day and Statutory Instrument 2020 No. 1359 – made 26th November 2020 and cited as the Construction Products (Amendment etc.) (EU Exit) Regulations 2020 and coming into force immediately before the 2019 Regulations come into force, on the procedure for attesting the conformity of construction products as regards fire stopping, fire sealing and fire protective products, published as 'Pre-Exit' European Assessment Documents, (see https://www.gov.uk/guidance/pre-exit-european-assessment-documents-construction-products), the system of assessment and verification of constancy of performance (see Annex V to Construction Products Regulation 2011 as amended by the Construction Products (Amendment etc.) (EU Exit) Regulations 2019 and the Construction Products (Amendment etc.) (EU Exit) Regulations 2020) given in the following table(s) apply.

Product(s)	Intended use(s)	Level(s) or class(es)	System
Fire Stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	any	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Tasks of the manufacturer:
Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the product is in conformity with this UK Technical Assessment.

The manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this UK Technical Assessment.

The factory production control shall be in accordance with the Control Plan of 15/01/2020 relating to the UK Technical Assessment 0843-UKTA-22/0037 issued on 20/01/2023 which is part of the technical documentation of this UK technical Assessment. The "Control Plan" is laid down in the context of the factory production control system operated by the manufacturer and deposited at UL International (UK) Ltd.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the Control Plan.

Other tasks of the manufacturer
Additional information

The manufacturer shall provide a technical data sheet and an installation instruction with the following minimum information:

(a) Technical data sheet:

- Field of application:
- Building elements for which the penetration seal is suitable, type and properties of the building elements like minimum thickness, density, and - in case of lightweight constructions – the construction requirements.
- Limits in size, minimum thickness etc. of the penetration seal
- Construction of the penetration seal including the necessary components and additional products (e.g. backfilling material) with clear indication whether they are generic or specific.
- Services which the penetration seal is suitable, type and properties of the services like material, diameter, thickness etc. in case of pipes including insulation materials; necessary/allowed supports/fixings (e.g. pipe trays)

(b) Installation instruction:

- Steps to be followed
- Procedure in case of retrofitting
- Stipulations on maintenance, repair and replacement

Issued on: 20th January 2023

Report by:

C. Sweeney
Project Engineer Associate
Built Environment
For and on behalf of UL International (UK) Ltd.

Reviewed by:

C. Johnson
Senior Staff Engineer
Built Environment

ANNEX A: REFERENCE DOCUMENTS and LIST OF ABBREVIATIONS

A.1 References to standards mentioned in the UKTA

EN 1026	Windows and doors – Air permeability – Test method
EN 12667	Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance
EN 13501-1	Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests
EN 13501-2	Fire classification of construction products and building elements – Part 2: Classification using test data from fire resistance tests
EN ISO 20140-10	Acoustics; measurement of sound insulation in buildings and of building elements; part 10: laboratory measurement of airborne sound insulation of small building elements (ISO 140-10:1991)
EN ISO 717-1	Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation

A.2 Other reference documents

EOTA TR 001	Determination of impact resistance of panels and panel assemblies
EOTA TR 024	Characterisation, Aspects of Durability and Factory Production Control for Reactive Materials, Components and Products

Safety Data Sheet according to 1907/2006/EC, Article 31, for Hilti Firestop Mortar CFS-M RG

A.3 Abbreviations used in drawings

Abbreviation	Description
A_1	Hilti Firestop Mortar CFS-M RG according to Annex B.1 of the UKTA
A_2	Hilti Firestop Bandage CFS-B according to Annex B.6 of the UKTA
A_3	Hilti Firestop Collar CFS-C P or CFS-C EL according to Annex B.2 and B.3 of the UKTA
A_4	Hilti Firestop Wrap CFS-W according to Annex B.5 of the UKTA
AP	Additional protection according to clause 1.1.2 of the UKTA
C, C_1, C_2, C_3	Penetrating Elements
D	Pipe insulation
d_A	Overlap of mortar (seal type 2)
d_c	Pipe diameter
E	Building element (wall, floor)
h	Height of penetration seal
l	Length of the penetration seal
L_D	Length of local pipe insulation
LAP	Length of the additional protection AP
s_1 to s_{14}	Distances
tA1	Thickness of the mortar seal
tAP	Thickness of the additional protection AP
t_c	Wall thickness of the pipe
t_D	Thickness of the pipe insulation
t_E	Thickness of the building element (wall, floor)
w	Width of penetration seal

ANNEX B: DESCRIPTION OF PRODUCT(S) & PRODUCT LITERATURE

B.1 Hilti Firestop Mortar CFS-M RG

The Control Plan is defined in document "Control Plan relating to the UK Technical Assessment UKTA-22/0037 - Hilti Firestop Mortar CFS-M RG" which is a non-public part of this UKTA.

B.2 Hilti Firestop Collar CFS-C EL

See UKTA-22/0035 (ETA-14/0085)

B.3 Hilti Firestop Collar CFS-C P

See UKTA-22/0043 (ETA-10/0404)

B.4 Fixing for Hilti Firestop Collars CFS-C and CFS-C P

Threaded rods M8, galvanised, minimum strength category 4.6, washers A 8.4-28 s=2mm, galvanised, nuts M8, galvanised

B.5 Hilti Firestop Wrap CFS-W

See UKTA-22/0042 (ETA-10/0405)

B.6 Hilti Firestop Bandage CFS-B

See UKTA-22/0038 (ETA-20/0993)

B.7 Hilti Firestop Acrylic Sealant CFS-S ACR

See UKTA-22/0045 (ETA-10/0292)

B.8 Technical Product Literature

Technical data sheet Hilti Firestop Mortar CFS-M RG (including the additional components Hilti Firestop Collars CFS-C E L and CFS-C P, Hilti Firestop Wrap CFS-W and Hilti Firestop Bandage CFS-B).

ANNEX C: RESISTANCE TO FIRE CLASSIFICATION OF PENETRATION SEALS MADE OF HILTI FIRESTOP MORTAR CFS-M RG

C.1 Rigid wall type A according to clause 1.2.1 of the UKTA (density ≥ 550 kg/m³), minimum thickness 150 mm

Penetration seal

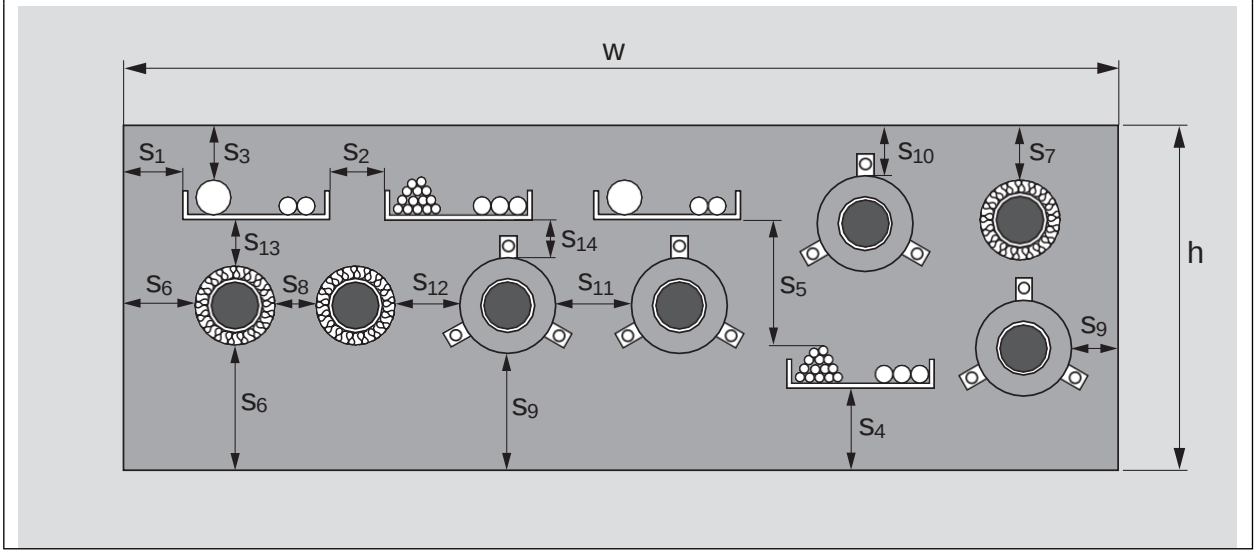
Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 150 mm (opening depth t_E filled completely).

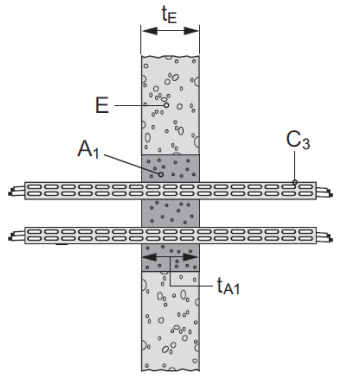
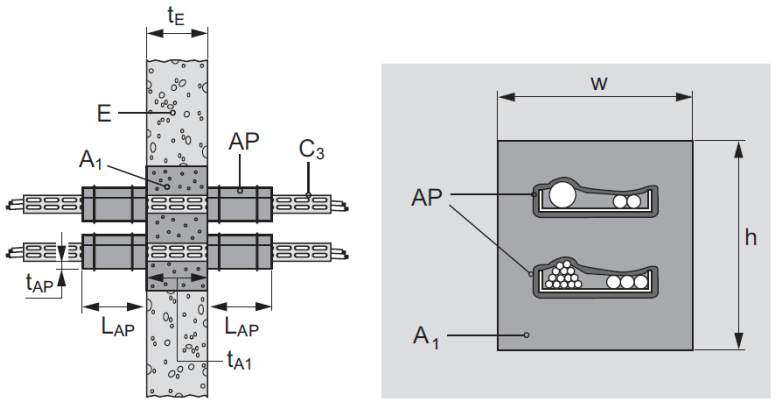
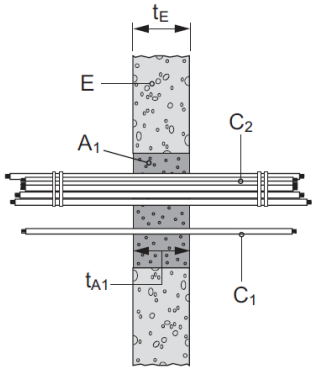
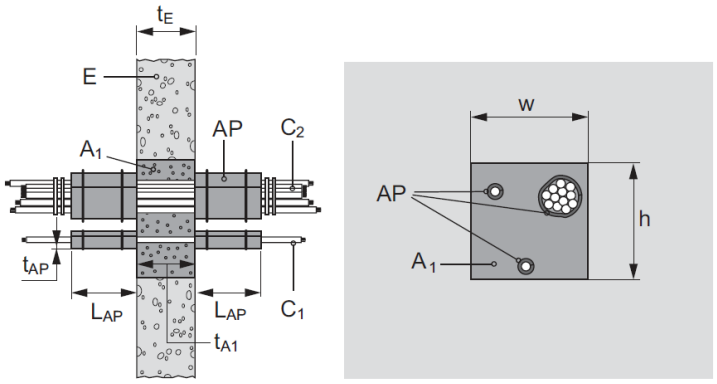
Maximum distance to first service support construction: 260 mm subject to deviating values given in the tables below.

Maximum seal size: w x h = 1200 x 2000 mm Minimum distances

in mm (see illustration below):

s_1 = 0 (distance between cables/cable supports and seal edge)
s_2 = 0 (distance between cable supports)
s_3 = 0 (distance between cables and upper seal edge)
s_4 = 0 (distance between cable supports and bottom seal edge) s_6 = 0 (distance between metal pipes and seal edge)
s_8 = 0 (distance between metal pipes) in case of mineral wool insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_8 = 10 (distance between metal pipes) in case of Armaflex insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_9 = 117 (distance between plastic pipes/pipe closure devices and seal edge)
s_{11} = 0 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collar CFS-C P and linear arrangement; in case of cluster arrangement s_{11} = 100 mm
s_{11} = 50 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collar CFS-C EL and linear arrangement; in case of cluster arrangement s_{11} = 100 mm
s_{12} = 0 (distance between metal pipes and plastic pipes/pipe closure devices) s_{13} = 0 (distance between cables/cable supports and metal pipes)
s_{14} = 0 (distance between cables/cable supports and plastic pipes/pipe closure devices)



Penetrating elements (single, multiple or mixed):		
C.1.1 Cables		
Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): Additional protection AP according to clause 1.1.2 of the UKTA may be used as illustrated below.		
Cables on trays without additional protection  	Cables on trays with additional protection AP  	
Single cables / cable bundles without additional protection  	Single cables / cable bundles with additional protection AP  	
	Classification	
Additional protection according to clause 1.1.2 of the UKTA:	without	with
All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, with or without cable supports, with a diameter of:		
Maximum Ø 21 mm	EI 120	EI 120
21 ≤ Ø ≤ 50 mm	EI 90	EI 120
50 ≤ Ø ≤ 80 mm	EI 90	EI 120
Non-sheathed cables (wires) currently and commonly used in building practice in Europe, with or without cable supports, with a diameter of:		
Maximum Ø 17 mm	EI 30	EI 120
Maximum Ø 24 mm	EI 30	EI 120
Tied cable bundle[3], maximum diameter of single cable 21 mm, with or without cable support. For tied cable bundles the space between the cables needs not be sealed.		
Maximum Ø 100 mm	EI 120	EI 120

3 Several cables running in the same direction and bound closely together by mechanical means

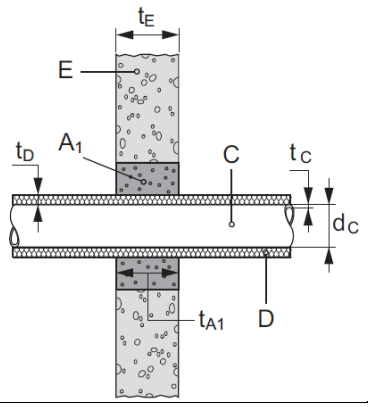
C.1.2 Small conduits and tubes	
Construction details: see Annex C.1.1 of the UKTA In case a conduit is installed with open ends on both sides of the wall (case U/U) both ends of the conduit must be closed using an acrylic sealant, e.g. Hilti Firestop Sealant CFS-S ACR.	
	Classification
Ø ≤ 16 mm, arranged linear, with or without cables, with or without cable supports	
Plastic conduits and tubes	EI 180-U/C
Steel conduits and tubes	EI 180-C/U

C.1.3 Metal pipes

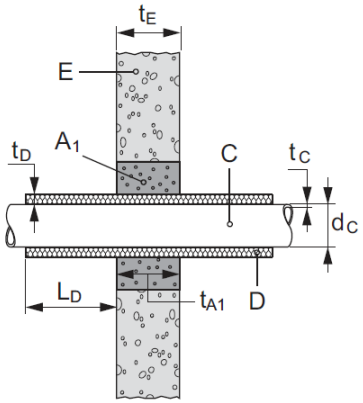
C.1.3.1 Metal pipes with mineral wool insulation according to Table C.2 of the UKTA

Pipes arranged linear
Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

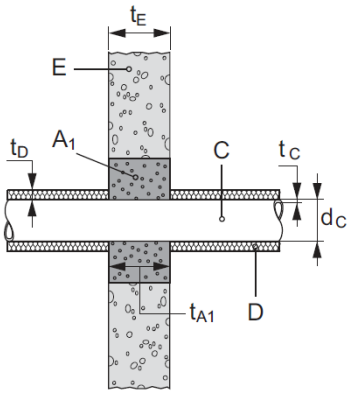
Continued insulation, sustained (CS)



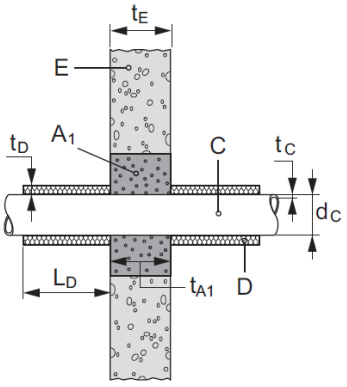
Local insulation, sustained (LS)



Continued insulation, interrupted (CI)



Local insulation, interrupted (LI)



Steel pipes (C) with continued insulation (D) – sustained

Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 20	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
≥ 40	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 120-C/U

4 Interpolation of minimum pipe wall thickness between 2,2 mm for diameter 26,7 mm and 2,9 mm for diameter 76 mm for pipe diameters in between.

5 14,2 mm is the maximum value covered by the rules in EN 1366-3. This value may be limited by the particular pipe dimensions available in practice.

Steel pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
20	≥ 500	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
40	≥ 500	76,0	2,9 – 14,2[5]	EI 120-C/U
40	≥ 500	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 90-C/U

Steel pipes (C) with continued insulation (D) – interrupted Maximum distance of 1st support from mortar seal: 200 mm			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 40	114,3	3,7 – 14,2[5]	EI 120-C/U

Steel pipes (C) with local insulation (D) – interrupted Maximum distance of 1st support from mortar seal: 200 mm				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
40	≥ 800	114,3	3,7 – 14,2[5]	EI 120-C/U

The field of application given above for steel pipes is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NrCr and NiMo alloys)

Copper pipes (C) with continued insulation (D) – sustained			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 20	28 - 54	1,0 / 1,5[7] – 14,2[5]	EI 120-C/U
≥ 40	54 - 89	1,5 / 2,0[8] – 14,2[5]	EI 120-C/U

Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
20	≥ 500	28 - 54	1,0 / 1,5[7] – 14,2[5]	EI 120-C/U
40	≥ 500	54	1,5 – 14,2[5]	EI 120-C/U
40	≥ 800	54 - 89	1,5 / 2,0[8] – 14,2[5]	EI 120-C/U

The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.

6 Interpolation of minimum pipe wall thickness between 2,9 mm for diameter 76 mm and 3,6 mm for diameter 168,3 mm for pipe diameters in between.

7 Interpolation of minimum pipe wall thickness between 1,0 mm for diameter 28 mm and 1,5 mm for diameter 54 mm for pipe diameters in between.

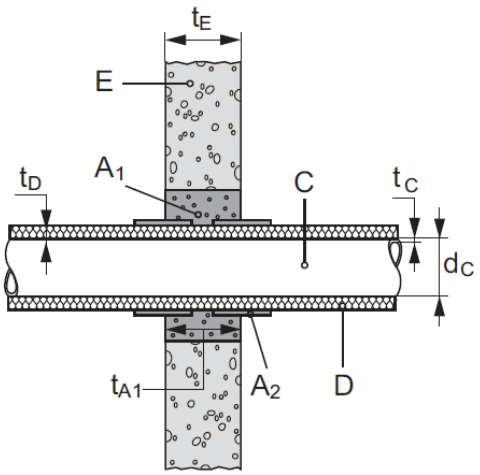
8 Interpolation of minimum pipe wall thickness between 1,5 mm for diameter 54 mm and 2,0 mm for diameter 89 mm for pipe diameters in between.

C.1.3.2 Metal pipes with Armaflex AF insulation and Hilti Firestop Bandage CFS-B

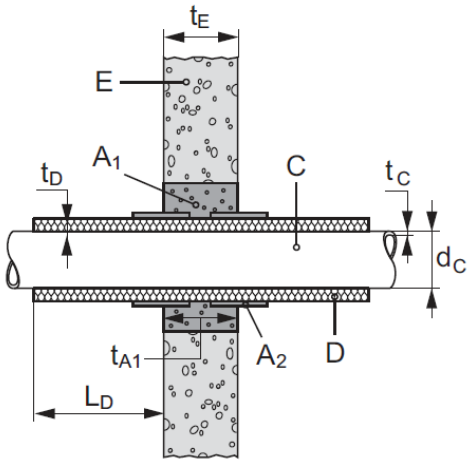
Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): For specification of Armaflex AF see Annex D Table D.3 of the UKTA.

Two layers of Firestop Bandage CFS-B (A_2) wrapped around the pipe insulation, on each side of the seal. The bandage is positioned with half of its width (62.5 mm) within the seal (central marking line at the surface of the seal) and outside the seal fastened with wire.

Continued insulation, sustained (CS)



Local insulation, sustained (LS)



Steel pipes (C) with continued insulation (D) – sustained

Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
19	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
19 - 41	76,0	2,9 – 14,2[5]	EI 120-C/U
41	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 120-C/U

Steel pipes (C) with local insulation (D) – sustained

Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
19	≥ 500	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
19 - 41	≥ 500	76,0	2,9 – 14,2[5]	EI 120-C/U
41	≥ 500	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 60-C/U

The field of application given above for steel pipes is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NrCr and NiMo alloys)

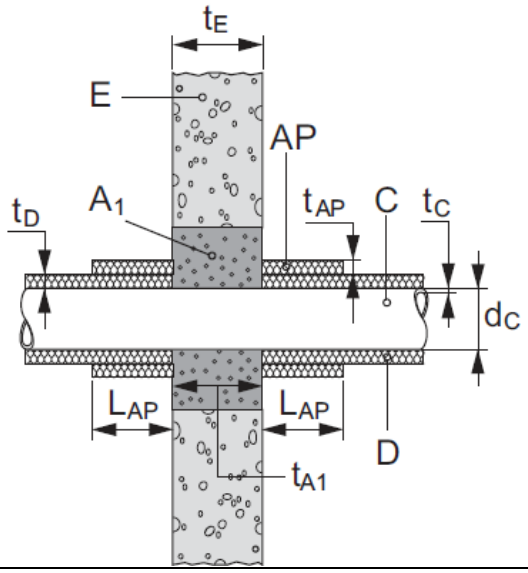
Copper pipes (C) with continued insulation (D) – sustained

Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
19	28 - 54	1,0 / 1,5[7] – 14,2[5]	EI 120-C/U
19 - 41	54	1,5 – 14,2[5]	EI 120-C/U
41	54 - 89	1,5 / 2,0[8] – 14,2[5]	EI 120-C/U

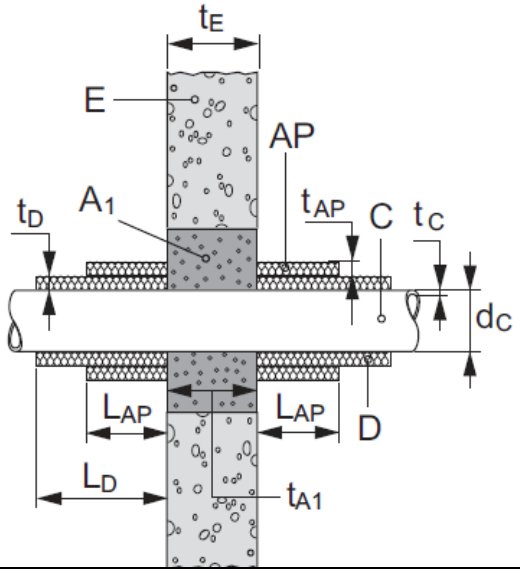
Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
19	≥ 500	28 - 54	$1,0 / 1,5^{7} – 14,2^{5}$	EI 120-C/U
19 - 41	≥ 500	54	$1,5 – 14,2^{5}$	EI 120-C/U
41	≥ 800	54 - 89	$1,5 / 2,0^{8} – 14,2^{5}$	EI 120-C/U
The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100°C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.				

C.1.3.3 Metal pipes with Armaflex AF insulation
Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): Additional protection with Armaflex AF, thickness 25 mm over a length of 200 mm from the seal on both sides. For specification of Armaflex AF see Annex D Table D.3 of the UKTA. Maximum distance to first service support construction from mortar seal: 200 mm

Continued insulation, interrupted (CI)



Local insulation, interrupted (LI)



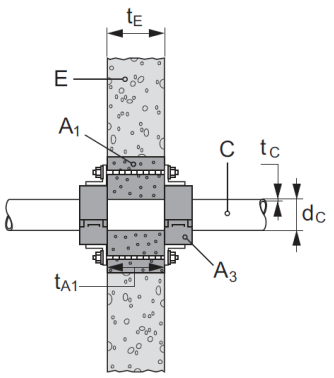
Steel pipes (C) with continued insulation (D) – interrupted			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 25	114,3	$7,1 – 14,2^{5}$	EI 120-C/U

Steel pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
25	≥ 780	114,3	$7,1 – 14,2^{5}$	EI 120-C/U

C.1.4 Plastic pipes with Hilti Firestop Collar CFS-C P

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

Hilti Firestop Collars CFS-C P (A_3) are installed on both sides of the mortar seal, fastened together by threaded rods, washers and nuts as specified in Annex B.4 of the UKTA.



C.1.4.1 PVC-U pipes according to EN ISO 15493 and EN ISO 1452

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,4 – 5,6	CFS-C P 50/1.5”	2	EI 120-U/U
63	3,0 – 4,7	CFS-C P 63/2”	2	EI 120-U/U
75	2,2 – 3,6	CFS-C P 75/2.5”	3	EI 180-U/U
90	2,7 – 4,3	CFS-C P 90/3”	3	EI 120-U/U
110	2,2 – 8,1	CFS-C P 110/4”	4	EI 120-U/U
110	8,1	CFS-C P 110/4”	4	EI 180-U/U
125	3,7 – 6,0	CFS-C P 125/5”	4	EI 120-U/U
160	2,5 – 11,8	CFS-C P 160/6”	6	EI 120-U/U
160	11,8	CFS-C P 160/6”	6	EI 180-U/U

C.1.4.2 PE pipes according to EN ISO 15494

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,9	CFS-C P 50/1.5”	2	EI 180-U/U
50	2,9 – 4,6	CFS-C P 50/1.5”	2	EI 120-U/U
63	1,8 – 5,8	CFS-C P 63/2”	2	EI 90-U/U
63	3,6 – 5,8	CFS-C P 63/2”	2	EI 120-U/U
75	1,9 – 6,8	CFS-C P 75/2.5”	3	EI 120-U/U
90	2,2 – 8,2	CFS-C P 90/3”	3	EI 120-U/U
110	2,7 – 10,0	CFS-C P 110/4”	4	EI 120-U/U
125	3,1 – 7,1	CFS-C P 125/5”	4	EI 120-U/U
160	4,0 – 9,1	CFS-C P 160/6”	6	EI 120-U/U
160	9,1	CFS-C P 160/6”	6	EI 180-U/U

C.1.4.3 PE pipes according to EN 1519-1				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	3,0	CFS-C P 50/1.5”	2	EI 120-U/U
63	3,0	CFS-C P 63/2”	2	EI 180-U/U
75	3,0	CFS-C P 75/2.5”	3	EI 120-U/U
90	3,5	CFS-C P 90/3”	3	EI 180-U/U
110	4,2	CFS-C P 110/4”	4	EI 120-U/U
125	4,8	CFS-C P 125/5”	4	EI 120-U/U
160	6,2	CFS-C P 160/6”	6	EI 120-U/U

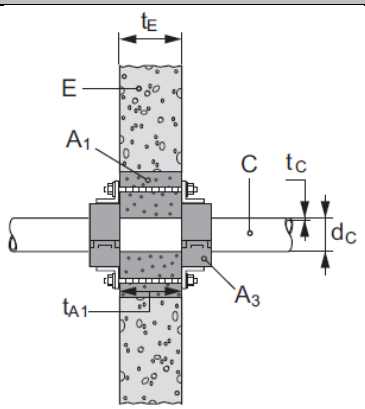
C.1.5 Plastic pipes with Hilti Firestop Collar CFS-C EL

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

Hilti Firestop Collars CFS-C EL (A_3) are installed on both sides of the mortar seal, fastened together by threaded rods, washers and nuts as specified in Annex B.8 of the UKTA.

Maximum distance of 1st support from mortar seal: 200 mm.

Restrictions by national building regulations to use seals with classification extension U/C have to be considered.



C.1.5.1 PVC-U pipes according to EN ISO 15493 and EN ISO 1452				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,2	CFS-C EL50/1.5”	2	EI 180-U/C
110	3,7 – 12,8	CFS-C EL 110/4”	3	EI 180-U/C

C.2	Rigid wall type B according to clause 1.2.1 of the UKTA (density ≥ 1100 kg/m³), minimum thickness 175 mm

Penetration seal

Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 150 mm (opening depth t_E filled completely).

Maximum distance to first service support construction: 230 mm. Maximum

seal size: w x h = 1000 x 1500 mm

Minimum distances in mm (for illustration see Annex C.1 of the UKTA):

s_9 = 210 (distance between plastic pipes/pipe closure devices and seal edge) s_{11} = 100 (distance

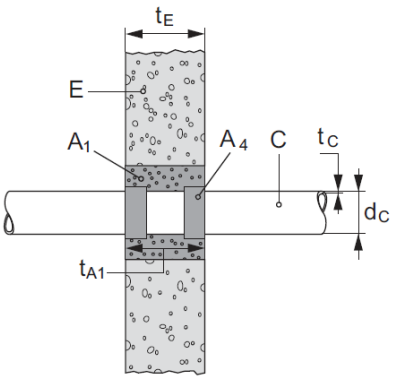
between plastic pipes/pipe closure devices

s_1 = 0 (distance between cables/cable supports and seal edge) s_2 = 0
(distance between cable supports)
s_3 = 0 (distance between cables and upper seal edge)
s_4 = 0 (distance between cable supports and bottom seal edge) s_6 = 0
(distance between metal pipes and seal edge)
s_8 = 0 (distance between metal pipes) in case of mineral wool insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_8 = 10 (distance between metal pipes) in case of Armaflex insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_9 = 117 (distance between plastic pipes/pipe closure devices and seal edge)
s_{11} = 0 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collar CFS-C P and linear arrangement; in case of cluster arrangement s_{11} = 100 mm
s_{11} = 50 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collar CFS-C EL and linear arrangement; in case of cluster arrangement s_{11} = 100 mm
s_{11} = 100 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Wrap CFS-W
s_{12} = 0 (distance between metal pipes and plastic pipes/pipe closure devices) s_{13} = 0 (distance between cables/cable supports and metal pipes)

s_{14} = 0 (distance between cables/cable supports and plastic pipes/pipe closure devices)

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

Hilti Firestop Wrap CFS-W (A_4) on both sides of the mortar seal, flush with the surface of the seal



Penetrating elements: in addition to the elements as in Annex C.1 of the UKTA (single, multiple or mixed):				
C.2.1 Plastic pipes with Hilti Firestop Wrap CFS-W				
C.2.1.1 PVC pipes according to EN ISO 15493 and EN ISO 1452				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
90	3,2	CFS- W SG	90/3”	EI 240-U/C
110	3,2	CFS- W SG	110/4”	EI 240-U/C
> 75 ≤ 110	3,2	CFS-W EL	2	EI 240-U/C
160	3,2 – 13,0	CFS- W SG	160/6”	EI 240-U/C
> 125 ≤ 160	3,2 – 13,0	CFS-W EL	3	EI 240-U/C
C.2.1.2 PE pipes according to EN ISO 15494				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 240-U/C
90	2,7	CFS- W SG	90/3”	EI 240-U/C
110	2,7	CFS- W SG	110/4”	EI 240-U/C
> 75 ≤ 110	2,7	CFS-W EL	2	EI 240-U/C
160	4,0 – 14,6	CFS- W SG	160/6”	EI 240-U/C
> 125 ≤ 160	4,0 – 14,6	CFS-W EL	3	EI 240-U/C
C.2.1.3 PE pipes according to EN 1519-1				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
160	6.2	CFS-W SG	160/6”	EI 180-U/C
> 125 ≤ 160	6.2	CFS-W EL	3	EI 180-U/C

C.3 Rigid floor type A according to clause 1.2.1 of the UKTA (density ≥ 550 kg/m³), minimum thickness 150 mm

Penetration seal

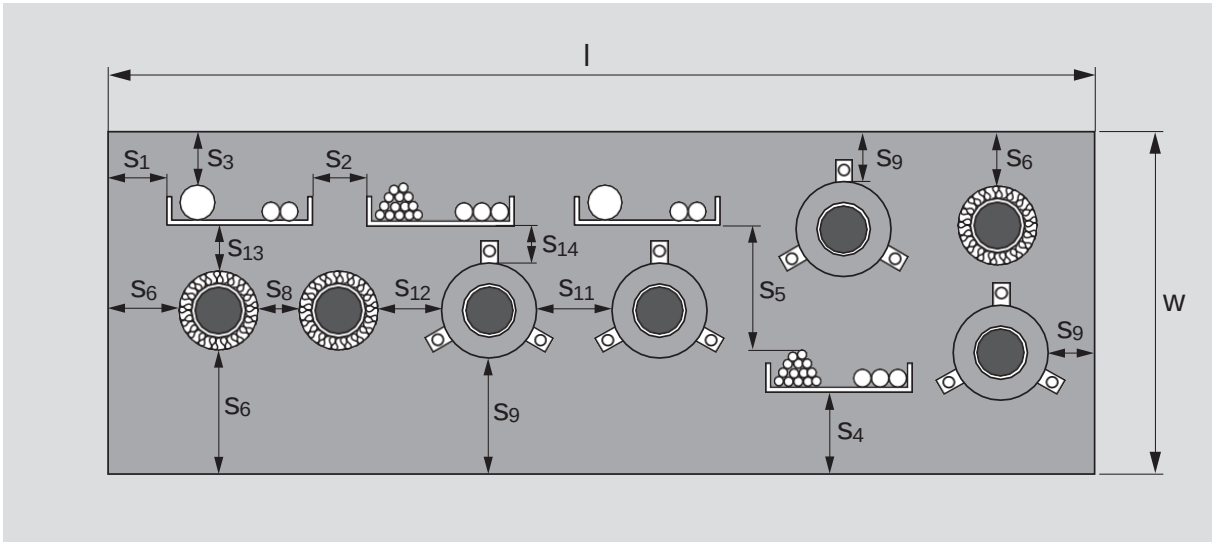
Type 1: Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 150 mm (opening depth t_E filled completely).

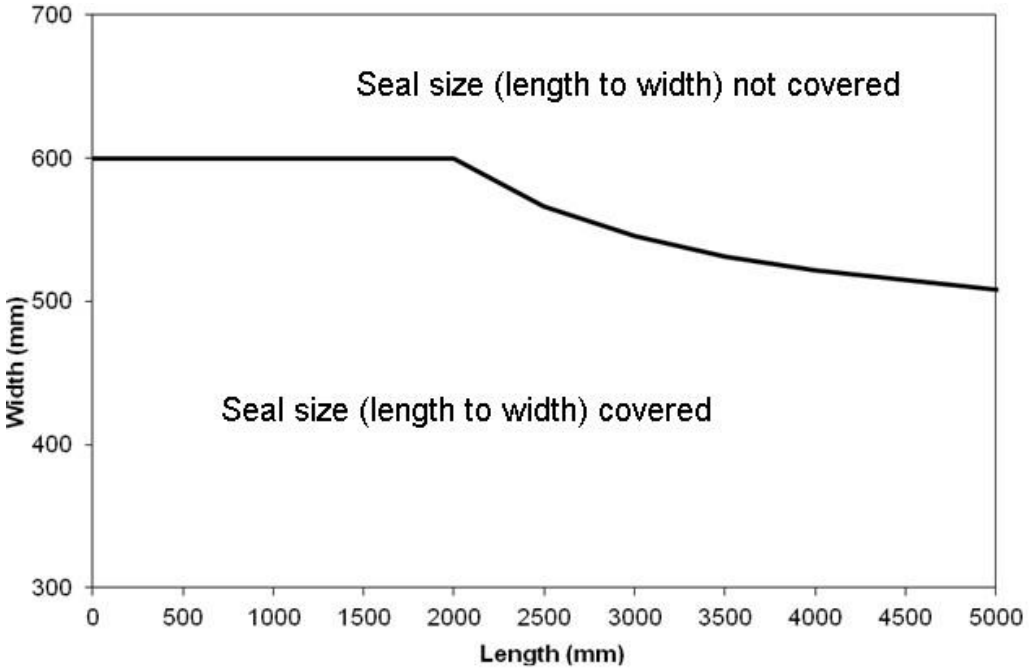
Type 2: Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 200 mm (opening depth t_E filled completely), with an overlap of the mortar seal of 50 mm over the top side of the floor on all sides of the opening.

Maximum distance to first service support construction: 300 mm. Maximum seal size:

see figure below

Minimum distances in mm (for illustration see below):
s_1 = 0 (distance between cables/cable supports and seal edge) s_2 = 0
(distance between cable supports)
s_3 = 0 (distance between cables and upper seal edge)
s_4 = 0 (distance between cable supports and bottom seal edge) s_6 = 0
(distance between metal pipes and seal edge)
s_8 = 0 (distance between metal pipes) in case of mineral wool insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_8 = 12 (distance between metal pipes) in case of Armaflex insulation and linear arrangement; in case of cluster arrangement s_8 = 100 mm
s_9 = 0 (distance between plastic pipes/pipe closure devices and seal edge)
s_{11} = 0 (distance between plastic pipes/pipe closure devices) and linear arrangement; in case of cluster arrangement s_{11} = 100 mm
s_{12} = 30 (distance between metal pipes and plastic pipes/pipe closure devices) s_{13} = 30
(distance between cables/cable supports and metal pipes)
s_{14} = 18 (distance between cables/cable supports and plastic pipes/pipe closure devices)





Seal sizes covered in floor type A application (length x width)

Penetrating elements (single, multiple or mixed):

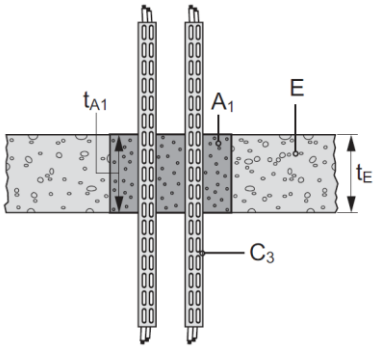
C.3.1 Cables

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

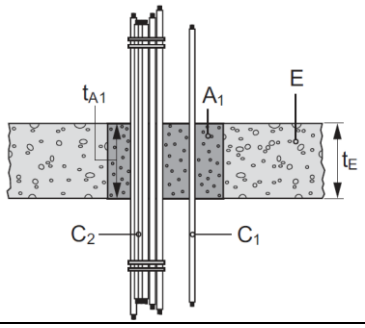
Additional protection AP according to clause 1.1.2 of the UKTA as illustrated below depending on the required classification.

Seal type 1

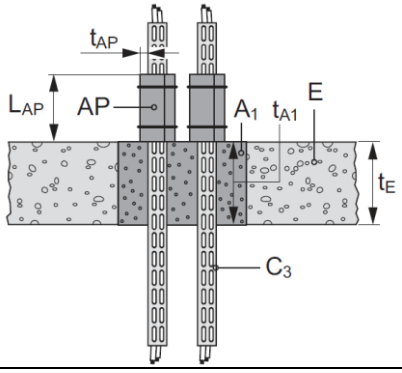
Cables on trays without additional protection



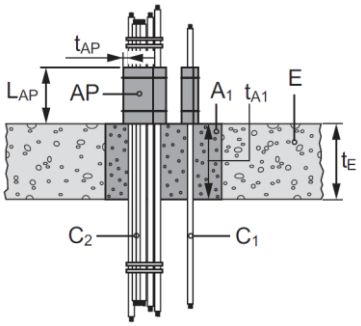
Single cables / cable bundles without additional protection

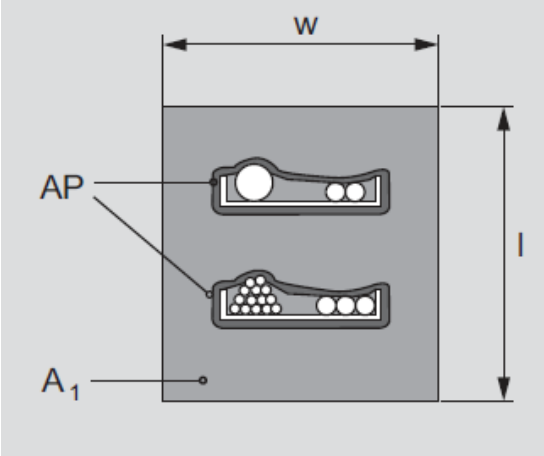


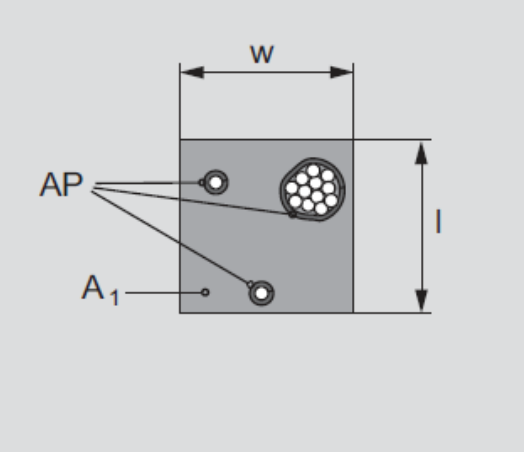
Cables on trays with additional protection AP



Single cables / cable bundles with additional protection AP

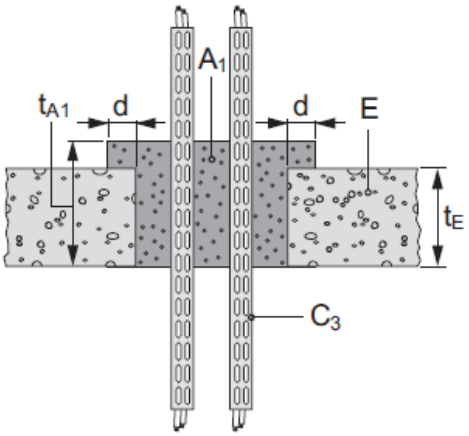




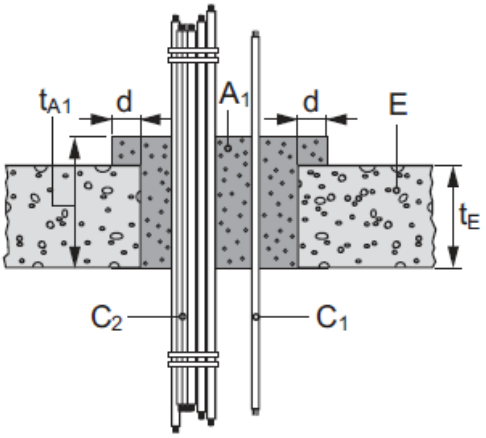


Seal type 2

Cables on trays without additional protection



Single cables / cable bundles without additional protection



		Classification	
Seal thickness (mm)	200 (Type 2)	150 (Type 1)	150 (Type 1)
Additional protection according to clause 1.1.2 of the UKTA:	without	without	with
All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, with cable supports, with a diameter of:			
Maximum Ø 21 mm	EI 90	EI 90	EI 90
21 ≤ Ø ≤ 50 mm	EI 90	EI 60	EI 90
50 ≤ Ø ≤ 80 mm	EI 90	EI 60	EI 90
Non-sheathed cables (wires) currently and commonly used in building practice in Europe, with or without cable supports, with a diameter of:			
Maximum Ø 17 mm	EI 90	EI 45	EI 90
Maximum Ø 24 mm	EI 45	EI 45	EI 60
Tied cable bundle[9], maximum diameter of single cable 21 mm, with or without cable supports. For tied cable bundles the space between the cables needs not be sealed.			
Maximum Ø 100 mm	EI 90	EI 90	EI 90

[9] Several cables running in the same direction and bound closely together by mechanical means

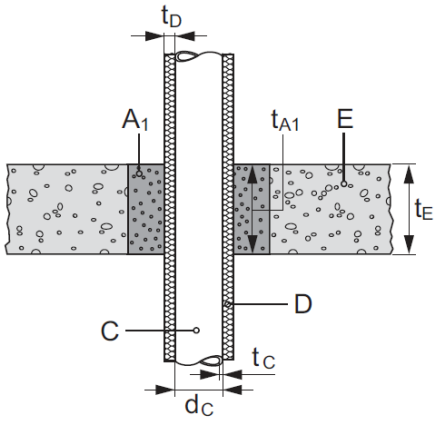
C.3.2 Small conduits and tubes			
Construction details: see Annex C.1.1 of the UKTA In case a conduit is installed with open ends on both sides of the floor (case U/U) the ends of the conduit must be closed using an acrylic sealant, e.g. Hilti Firestop Sealant CFS-S ACR: for metal conduits the end below the floor, for plastic conduits both ends.			
		Classification	
Seal thickness (mm)	200 (Type 2)	150 (Type 1)	150 (Type 1)
Ø ≤ 16 mm, arranged linear, with or without cables, with or without cable supports			
Additional protection according to clause 1.1.2 of the UKTA:	without	without	with
Plastic conduits and tubes	EI 120-U/C	EI 90-U/C	EI 90-U/C
Steel conduits and tubes	EI 120-C/U	EI 90-C/U	EI 90-C/U

C.3.3 Metal pipes

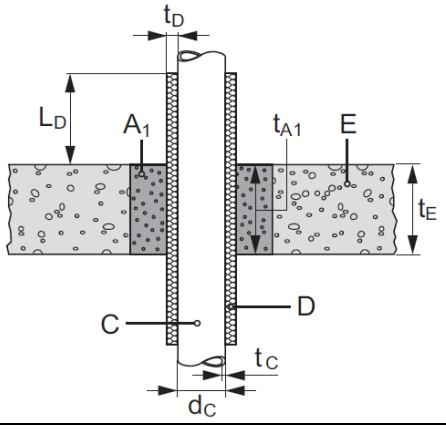
C.3.3.1 Metal pipes with mineral wool insulation according to Table C.2 of the UKTA

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): Seal type 1 (see Annex C.2 of the UKTA)

Continued insulation, sustained (CS)



Local insulation, sustained (LS)



Steel pipes (C) with continued insulation (D) – sustained

Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 20	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
≥ 40	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 120-C/U

Steel pipes (C) with local insulation (D) – sustained

Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
20	≥ 500	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 120-C/U
40	≥ 500	76,0	2,9 – 14,2[5]	EI 120-C/U
40	≥ 700	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 120-C/U

The field of application given above for steel pipes is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NrCr and NiMo alloys)

Copper pipes (C) with continued insulation (D) – sustained			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 20	28 - 54	1,0 / 1,5[7] – 14,2[5]	EI 120-C/U
≥ 40	54 - 89	1,5 / 2,0[8] – 14,2[5]	EI 120-C/U

Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
20	≥ 500	28 - 54	1,0 / 1,5[7] – 14,2[5]	EI 120-C/U
40	≥ 500	54	1,5 – 14,2[5]	EI 120-C/U
40	≥ 800	54 - 89	1,5 / 2,0[8] – 14,2[5]	EI 120-C/U

The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.

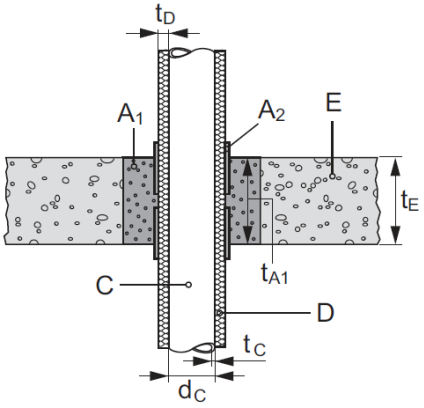
C.3.3.2 Metal pipes with Armaflex AF insulation and Hilti Firestop Bandage CFS-B

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): Seal type 1 (see Annex C.2 of the UKTA)

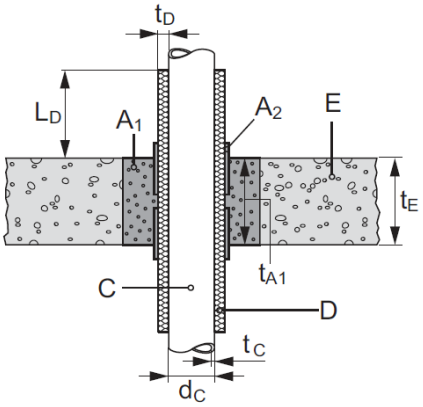
For specification of Armaflex AF see Annex D Table D.3 of the UKTA.

Two layers of of Firestop Bandage CFS-B (A_2) wrapped around the pipe insulation, on each side of the seal. The bandage is positioned with half of its width (62.5 mm) within the seal (central marking line at the surface of the seal) and outside the seal fastened with wire.

Continued insulation, sustained (CS)



Local insulation, sustained (LS)



Steel pipes (C) with continued insulation (D) – sustained			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
19	26,7	2,2 – 14,2[5]	EI 120-C/U
19	26,7 – 76,0	2,2 / 2,9[4] – 14,2[5]	EI 90-C/U
19 – 41	76,0	2,9 – 14,2[5]	EI 90-C/U
41	76,0	2,9 – 14,2[5]	EI 120-C/U
41	76,0 – 168,3	2,9 / 3,6[6] – 14,2[5]	EI 90-C/U

Steel pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
19	≥ 500	26,7	$2,2 – 14,2^5$	EI 120-C/U
19	≥ 500	26,7 – 76,0	$2,2 / 2,9^4 – 14,2^5$	EI 90-C/U
19 - 41	≥ 500	76,0	$2,9 – 14,2^5$	EI 90-C/U
41	≥ 500	76,0	$2,9 – 14,2^5$	EI 120-C/U
41	≥ 700	76,0 – 168,3	$2,9 / 3,6^6 – 14,2^5$	EI 90-C/U
The field of application given above for steel pipes is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NrCr and NiMo alloys)				

Copper pipes (C) with continued insulation (D) – sustained			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
19	28	$1,0 – 14,2^5$	EI 120-C/U
19	28 - 54	$1,0 / 1,5^7 – 14,2^5$	EI 90-C/U
19 - 41	54	$1,5 – 14,2^5$	EI 90-C/U
41	54 - 89	$1,5 / 2,0^8 – 14,2^5$	EI 120-C/U

Copper pipes (C) with local insulation (D) – sustained				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
19	≥ 500	28	$1,0 – 14,2^5$	EI 120-C/U
19	≥ 500	28 - 54	$1,0 / 1,5^7 – 14,2^5$	EI 90-C/U
19 - 41	≥ 500	54	$1,5 – 14,2^5$	EI 90-C/U
41	≥ 500	54	$1,5 – 14,2^5$	EI 120-C/U
41	≥ 800	54 - 89	$1,5 / 2,0^8 – 14,2^5$	EI 120-C/U
The field of application given above for copper pipes is also valid for other metal pipes with lower heat conductivity than copper and a melting point of minimum 1100 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NiCr and NiMo alloys) and Ni.				

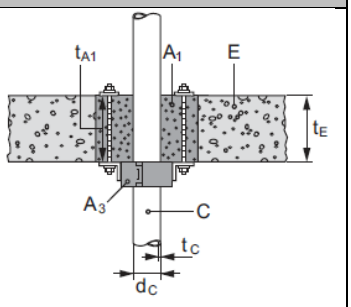
C.3.4 Plastic pipes with Hilti Firestop Collar CFS-C P

Construction details

(for symbols and abbreviations see Annex A.3 of the UKTA):

Seal type 1 (see Annex C.2 of the UKTA)

Hilti Firestop Collars CFS-C P (A_3) are installed on the bottom side of the mortar seal, fastened by threaded rods through the mortar seal, washers and nuts as specified in Annex B.8 of the UKTA.



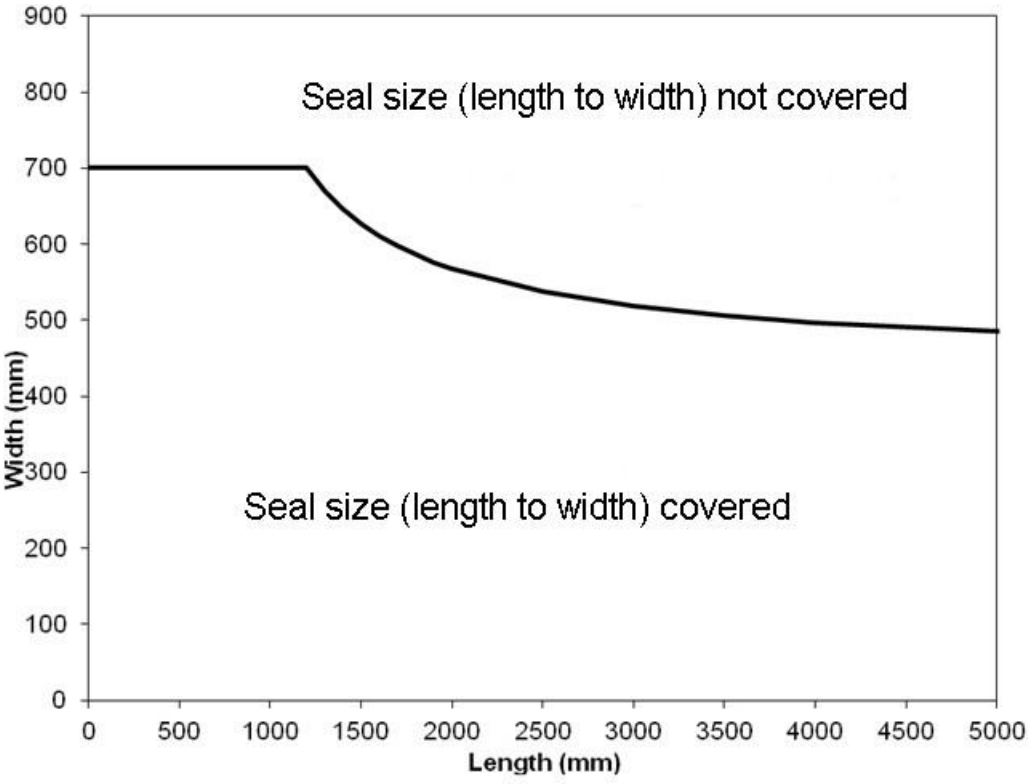
C.3.4.1 PVC-U pipes according to EN ISO 15493 and EN ISO 1452				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,4 – 5,6	CFS-C P 50/1.5”	2	EI 120-U/U
63	3,0 – 4,7	CFS-C P 63/2”	2	EI 120-U/U
75	2,2 – 3,6	CFS-C P 75/2.5”	3	EI 120-U/U
90	2,7 – 4,3	CFS-C P 90/3”	3	EI 120-U/U
110	1,8 – 8,1	CFS-C P 110/4”	4	EI 120-U/U
125	3,7 – 6,0	CFS-C P 125/5”	4	EI 120-U/U
160	2,5 – 11,8	CFS-C P 160/6”	6	EI 120-U/U
C.3.4.2 PE pipes according to EN ISO 15494				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,9 – 4,6	CFS-C P 50/1.5”	2	EI 120-U/U
63	1,8 – 5,8	CFS-C P 63/2”	2	EI 120-U/U
75	1,9 – 6,8	CFS-C P 75/2.5”	3	EI 120-U/U
90	2,2 – 8,2	CFS-C P 90/3”	3	EI 120-U/U
110	2,7 – 10,0	CFS-C P 110/4”	4	EI 120-U/U
125	3,1 – 7,1	CFS-C P 125/5”	4	EI 120-U/U
160	4,0 – 9,1	CFS-C P 160/6”	6	EI 120-U/U
C.3.4.3 PE pipes according to EN 1519-1				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	3,0	CFS-C P 50/1.5”	2	EI 120-U/U
63	3,0	CFS-C P 63/2”	2	EI 120-U/U
75	3,0	CFS-C P 75/2.5”	3	EI 120-U/U
90	3,5	CFS-C P 90/3”	3	EI 120-U/U
110	4,2	CFS-C P 110/4”	4	EI 120-U/U
125	4,8	CFS-C P 125/5”	4	EI 120-U/U
160	6,2	CFS-C P 160/6”	6	EI 120-U/U

C.4	Rigid floor type B according to clause 1.2.1 of the UKTA (density ≥ 2400 kg/m³), minimum thickness 150 mm

Penetration seal

Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 150 mm (opening depth t_E filled completely).
Maximum distance to first service support construction: 200 mm.
Maximum seal size: 1200 x 700 mm (l x w); for higher lengths see figure below Minimum distances in mm (for illustration see Annex C.3 of the UKTA):

s_1 = 20 (distance between cables/cable supports and seal edge) s_2 = 0 (distance between cable supports)
s_3 = 8 (distance between cables and upper seal edge)
s_4 = 0 (distance between cable supports and bottom seal edge) s_5 = 50 (distance between cables and cables support above)
s_6 = 30 (distance between metal pipes and seal edge) s_8 = 100 (distance between metal pipes)
s_9 = 40 (distance between plastic pipes/pipe closure devices and seal edge)
s_{11} = 0 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collars CFS-C P and linear arrangement
s_{11} = 50 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collars CFS-C EL and linear arrangement
s_{11} = 100 (distance between plastic pipes/pipe closure devices) in all cases of cluster arrangement
s_{12} = 40 (distance between metal pipes and plastic pipes/pipe closure devices) s_{13} = 20 (distance between cables/cable supports and metal pipes)
s_{14} = 40 (distance between cables/cable supports and plastic pipes/pipe closure devices)



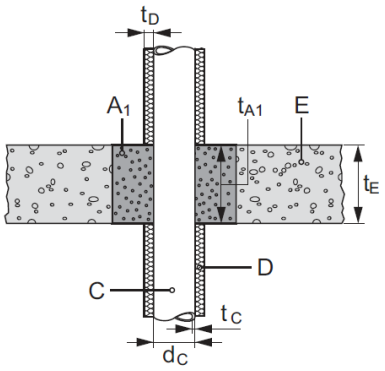
Seal sizes covered in floor type B application (length x width)

Penetrating elements: in addition to the e as in Annex C.3 of the UKTA (single, multiple or mixed):

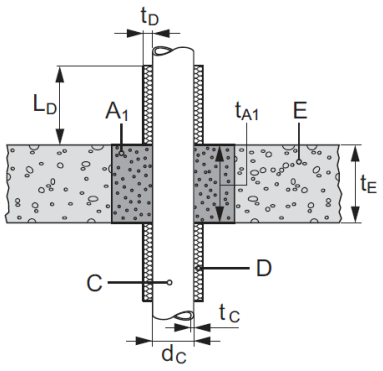
C.4.1 Metal pipes with mineral wool insulation according to Table C.2 of the UKTA

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

Continued insulation, interrupted (CI)



Local insulation, interrupted (LI)



Steel pipes (C) with continued insulation (D) – interrupted

Maximum distance of 1st support from mortar seal: 200 mm

Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 40	114,3	3,7 – 14,2[5]	EI 120-C/U

Steel pipes (C) with local insulation (D) – interrupted

Maximum distance of 1st support from mortar seal: 200 mm

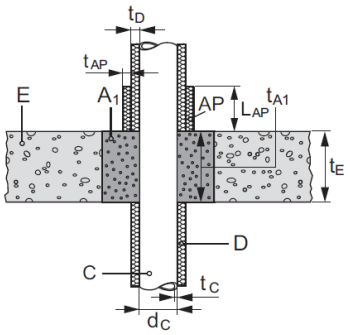
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
40	≥ 800	114,3	3,7 – 14,2[5]	EI 120-C/U

The field of application given above for steel pipes is also valid for other metal pipes with lower heat conductivity than unalloyed steel and a melting point of minimum 1050 °C, e.g. cast iron, stainless steels, Ni alloys (NiCu, NrCr and NiMo alloys)

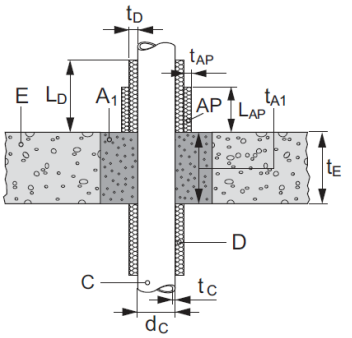
C.4.2 Metal pipes with Armaflex AF insulation

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA): For specification of Armaflex AF see Annex D Table D.3 of the UKTA. Additional protection with Armaflex AF, thickness 25 mm over a length of L_{AP} = 200 mm from the seal on the top side of the floor.

Continued insulation, interrupted (CI)



Local insulation, interrupted (LI)



Steel pipes (C) with continued insulation (D) – interrupted			
Insulation thickness (t_D) [mm]	Pipe diameter (d_C) [mm]	Pipe wall thickness (t_C) [mm]	Classification
≥ 25	114,3	7,1 – 14,2[5]	EI 180-C/U

Steel pipes (C) with local insulation (D) – interrupted				
Insulation		Pipe		Classification
thickness (t_D) [mm]	length (L_D) [mm]	diameter (d_C) [mm]	wall thickness (t_C) [mm]	
25	≥ 800	114,3	7,1 – 14,2[5]	EI 180-C/U

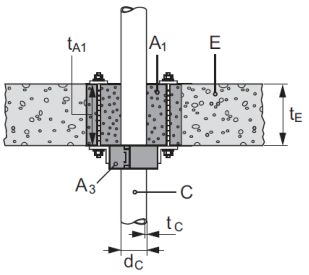
C.4.3 Plastic pipes with Hilti Firestop Collar CFS-C EL

Construction details

(for symbols and abbreviations see Annex A.3 of the UKTA):

Hilti Firestop Collars CFS-C E L (A_3) are installed on the bottom side of the mortar seal, fastened by threaded rods through the mortar seal, washers and nuts as specified in Annex B.8 of the UKTA.

Restrictions by national building regulations to use seals with classification extension U/C have to be considered.



C.4.3.1 PVC-U pipes according to EN ISO 15493 and EN ISO 1452

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Collar size (A_1)	No. of hooks	Classification
50	2,0	CFS-C EL 50/1.5”	2	EI 180-U/C
110	2,7 – 12,3	CFS-C EL 110/4”	3	EI 180-U/C

The results are also valid for PVC-C pipes according to EN 1566-1 and PVC-U pipes according EN 1329-1 and EN 1453-1.

C.5	Rigid floor type C according to clause 1.2.1 of the UKTA (density ≥ 2400 kg/m^3), minimum floor thickness 175 mm

Penetration seal

Hilti Firestop Mortar CFS-M RG (A_1), thickness (t_{A1}) ≥ 175 mm (opening depth t_E filled completely).

Maximum distance to first service support construction: 200 mm.

Maximum seal size: 1500 x1000 mm (l x w); for higher lengths see figure below Minimum

distances in mm (for illustration see Annex C.3 of the UKTA):

s_9 = 52 (distance between plastic pipes/pipe closure devices and seal edge) s_{11} = 100 (distance between plastic pipes/pipe closure devices)

s_1 = 20 (distance between cables/cable supports and seal edge) s_2 = 0 (distance between cable supports)

s_3 = 8 (distance between cables and upper seal edge)

s_4 = 0 (distance between cable supports and bottom seal edge) s_5 = 50 (distance between cables and cables support above)

s_6 = 30 (distance between metal pipes and seal edge) s_8 = 100 (distance between metal pipes)

s_9 = 52 (distance between plastic pipes/pipe closure devices and seal edge)

s_{11} = 0 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collars CFS-C P and linear arrangement

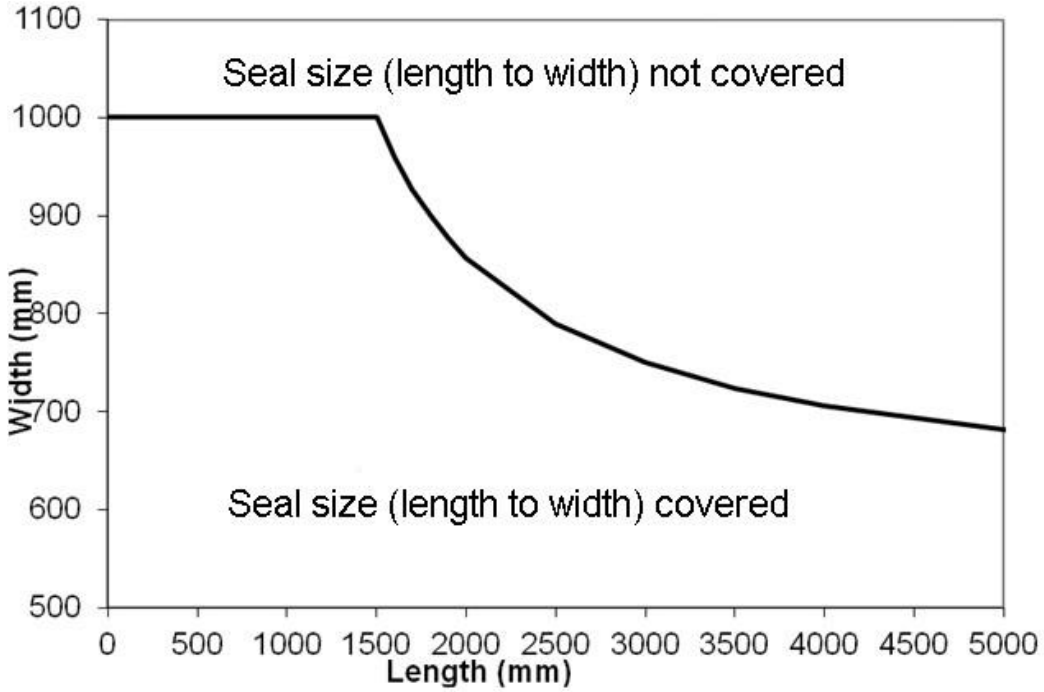
s_{11} = 50 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Collars CFS-C EL and linear arrangement

s_{11} = 100 (distance between plastic pipes/pipe closure devices) in case of Hilti Firestop Wraps CFS-W and linear arrangement

s_{11} = 100 (distance between plastic pipes/pipe closure devices) in all cases of cluster arrangement

s_{12} = 40 (distance between metal pipes and plastic pipes/pipe closure devices) s_{13} = 20 (distance between cables/cable supports and metal pipes)

s_{14} = 40 (distance between cables/cable supports and plastic pipes/pipe closure devices)



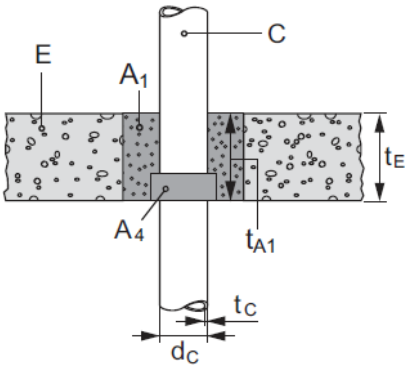
Seal sizes covered in floor application (length x width)

Penetrating elements: in addition to the elements as in Annex C.3 and C.4 of the UKTA (single, multiple or mixed):

C.5.1 Plastic pipes with Hilti Firestop Wrap CFS-W

Construction details (for symbols and abbreviations see Annex A.3 of the UKTA):

Hilti Firestop Wrap CFS-W (A_4) on the underside of the mortar seal flush with the lower surface of the mortar seal.



C.5.1.1 PVC-U pipes according to EN ISO 15493 and EN ISO 1452

Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 120-U/C
50	2,2 – 3,6	CFS-W SG	50/1.5”	EI 120-U/C
63	2,2 – 3,6	CFS- W SG	63/2”	EI 120-U/C
75	2,2 – 3,6	CFS- W SG	75/2.5”	EI 120-U/C
> 32 ≤ 75	2,2 – 3,6	CFS-W EL	1	EI 120-U/C
90	3,2 – 6,0	CFS- W SG	90/3”	EI 120-U/C
110	3,2 – 6,0	CFS- W SG	110/4”	EI 120-U/C
> 75 ≤ 110	3,2 – 6,0	CFS-W EL	2	EI 120-U/C
125	3,7 – 6,0	CFS- W SG	125/5”	EI 120-U/C
>110 ≤ 125	3,7 – 6,0	CFS-W EL	2	EI 120-U/C
160	2,5 – 3,2	CFS- W SG	160/6”	EI 60-U/C
> 125 ≤ 160	2,5 – 3,2	CFS-W EL	3	EI 60-U/C
160	3,2 – 13,0	CFS- W SG	160/6”	EI 120-U/C
> 125 ≤ 160	3,2 – 13,0	CFS-W EL	3	EI 120-U/C

C.5.1.2 PE pipes according to EN ISO 15494				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
≤ 32	1,8	CFS-W EL	1	EI 120-U/C
50	1,9 – 6,8	CFS-W SG	50/1.5”	EI 120-U/C
63	1,9 – 6,8	CFS- W SG	63/2”	EI 120-U/C
75	1,9 – 6,8	CFS- W SG	75/2.5”	EI 120-U/C
> 32 ≤ 75	1,9 – 6,8	CFS-W EL	1	EI 120-U/C
90	2,7 – 7,1	CFS- W SG	90/3”	EI 120-U/C
110	2,7 – 7,1	CFS- W SG	110/4”	EI 120-U/C
> 75 ≤ 110	2,7 – 7,1	CFS-W EL	2	EI 120-U/C
125	3,2 – 7,1	CFS- W SG	125/5”	EI 120-U/C
>110 ≤ 125	3,2 – 7,1	CFS-W EL	2	EI 120-U/C
160	4,0 – 14,6	CFS- W SG	160/6”	EI 120-U/C
> 125 ≤ 160	4,0 – 14,6	CFS-W EL	3	EI 120-U/C
C.5.1.3 PE pipes according to EN 1519-1				
Pipe diameter d_c (mm)	Pipe wall thickness t_c (mm)	Type of CFS-W (A_1)	Size (CFS-W SG) / No. of layers (CFS-W EL)	Classification
50	3,0	CFS-W SG	50/1.5”	EI 120-U/C
63	3,0	CFS- W SG	63/2”	EI 120-U/C
75	3,0	CFS- W SG	75/2.5”	EI 120-U/C
≤ 75	3,0	CFS-W EL	1	EI 120-U/C
90	4,8	CFS- W SG	90/3”	EI 120-U/C
110	4,8	CFS- W SG	110/4”	EI 120-U/C
125	4,8	CFS- W SG	125/5”	EI 120-U/C
>75 ≤ 125	4,8	CFS-W EL	2	EI 120-U/C
160	6,2	CFS- W SG	160/6”	EI 120-U/C
> 125 ≤ 160	6,2	CFS-W EL	3	EI 120-U/C

ANNEX D: SPECIFICATION OF MINERAL WOOL PRODUCTS AND PIPE INSULATION PRODUCTS

Table D.1: Specification for mineral wool products suitable for being used as additional protection for cables/cable supports

Characteristic	**Specification**	**Unit**
Stone wool according to EN 14303		
Reaction to fire class according to EN 13501-1	A1 or A2	-
Thermal conductivity at 20 °C	≤ 0.040	W/(mK)
Density	35 - 45	kg/m^3
Surface	Al-foil faced on one side	-

The following list contains suitable products but may not be exhaustive:

Manufacturer	**Product designation**
Isover	Ultimate U TFA 34
Knauf	Lamella Forte LLMF AluR
Paroc	Lamella Mat 35 Alu Coat
Rockwool	Klimafix
Rockwool	Klimarock
Rockwool	Rockwool 133 (Lamella mat)

Table D.2: Specification for mineral wool products suitable for being used as pipe insulation

Interrupted insulation
Stone wool according to EN 14303, class A2 or A1 according to EN 13501-1, Al-faced

Sustained insulation	
Manufacturer	**Product designation**
Isover	Coquilla AT-LR
Isover	Protect 1000 S alu
Isover	Protect BSR 90 alu
Paroc	Section AluCoat T
Rockwool	Conlit Pipe sections
Rockwool	Klimarock
Rockwool	RS 800 pipe sections

Table D.3: Specification for flexible elastomeric foam (FEF) products suitable for being used as pipe insulation

Manufacturer	**Product designation**
Armacell International GmbH	Armaflex AF (CE marked according to EN 14304)